

Appl. No. 10/754,026
Amdt. Dated November 27, 2007
Reply to Office Action of August 28, 2007

CLAIMS:

1. (Currently Amended) A system for outputting a signal representative of the angular position of a rotatable member, comprising:

a ring magnet couplable to the rotatable member, the magnet defining magnetic flux lines, said magnetic flux lines having a magnetic flux direction within the magnet and emanating from a magnetic pole on a first surface of said ring magnet and returning to an opposite magnetic pole on a second surface, said first surface being distinct from said second surface, portions of the magnetic flux lines being main flux lines emanating away from the magnet and aligned within 45 degrees with the direction of magnetization (14), and portions of the magnetic flux lines being return flux lines returning in directions forming an angle of more than 45 degrees with the direction of magnetization (14); and

at least one magnetic field sensor disposed in at least one of said return flux lines and outputting a signal representative of the angular position of the magnet.

2. (Original) The system of Claim 1, wherein the sensor is disposed radially outside of an outer diameter of the magnet.

3. (Original) The system of Claim 1, wherein the sensor is a Hall effect sensor.

4. (Original) The system of Claim 1, wherein the sensor is oriented to sense a radial component of magnetic flux.

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5. (Original) The system of Claim 4, wherein the sensor is located in a return flux line at a location where the return flux line is substantially parallel to an annular surface of the magnet.

6. (Original) The system of Claim 1, wherein the sensor is oriented to sense an axial component of magnetic flux.

7. (Original) The system of Claim 6, wherein the magnet defines a central axis and a plane perpendicular to the axis, the sensor being disposed substantially in the plane.

8. (Original) The system of Claim 1, wherein the rotatable member is a vehicle component.

9. (Currently Amended) A method for determining an angular position of a rotatable member, comprising:

providing a disk-shaped magnet defining magnetic flux lines, said magnetic flux lines having a magnetic flux direction within the magnet and emanating from a magnetic pole on a first surface of said disk-shaped magnet and returning to an opposite magnetic pole on a second surface of said disk-shaped magnet, said first surface being distinct from said second surface, portions of the magnetic flux lines being main flux lines emanating away from the magnet and aligned within 45 degrees with the direction of magnetization (14), and portions of the magnetic flux lines being return flux lines returning in directions forming an angle of more than 45 degrees with the direction of magnetization (14);

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sensing magnetic flux in at least one of said return flux lines; and
outputting a signal representative of the angular position of the magnet, based on
the sensing act.

10. (Original) The method of Claim 9, wherein the magnet is annular.
11. (Original) The method of Claim 9, wherein the sensor is a Hall effect sensor.
12. (Original) The method of Claim 9, comprising orienting the sensor to sense a radial component of magnetic flux.
13. (Original) The method of Claim 12, comprising locating the sensor in a return flux line at a location where the return flux line is substantially parallel to an annular surface of the magnet.
14. (Original) The method of Claim 9, comprising orienting the sensor to sense an axial component of magnetic flux.
15. (Original) The method of Claim 14, wherein the magnet defines a central axis and a plane perpendicular to the axis, the method including disposing the sensor substantially in the plane.

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16. (Original) The method of Claim 9, wherein the rotatable member is a vehicle component.

17. (Currently Amended) An angular position sensing system, comprising:

magnetic means selected from the group consisting of ring magnet and disk-shaped magnet for generating a magnetic field having magnetic flux lines, wherein said magnetic flux lines have a magnetic flux direction within the magnetic means and emanate from a magnetic pole on a first surface of said magnetic means and return to an opposite magnetic pole on a second surface of said magnetic means, said first surface being distinct from said second surface, portions of the magnetic flux lines being main flux lines emanating away from the magnet and aligned within 45 degrees with the direction of magnetization (14), and portions of the magnetic flux lines being return flux lines returning in directions forming an angle of more than 45 degrees with the direction of magnetization (14); and

sensing means disposed in said return flux lines generated by the magnetic means for outputting a signal representative of an angular position.

18. (Previously Presented) The system of Claim 17, wherein the sensing means is a sensor.

19 (Original) The system of Claim 18, wherein the sensor is a Hall effect sensor.

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20. (Original) The system of Claim 18, wherein the sensor is oriented to sense a radial component of magnetic flux.

21. (Previously Presented) The system of Claim 20, wherein the sensor is located in a radial return flux line at a location where the radial return flux line is substantially parallel to an annular surface of the magnet.

22. (Original) The system of Claim 18, wherein the sensor is oriented to sense an axial component of magnetic flux.

23. (Previously Presented) The system of Claim 22, wherein the magnet defines a central axis and a plane perpendicular to the axis, the sensor being disposed substantially in the plane.

24. (Previously Presented) The system of Claim 17, comprising a rotatable vehicle component coupled to the magnetic means.